

Sensor-less determination of load torque and time curve of slip in convert r-controlled asynchronous motor - measuring voltage and current, determining equivalent inductance and resistance, measuring current, voltage and slip of unloaded motor and gear

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Abstract

The time curve of the electric voltage ($u(t)$) and the resulting flow of electric current ($i(t)$) is measured at the terminals of the asynchronous motor. The measurement values of current and voltage are fed in to the processor and the voltage ($u(t)$) of an associated equivalent inductance ($l'(t)$) and an equivalent resistance ($r'(t)$) is determined.

During a running of the unloaded motor at two different times (t) at least, the associated pair of values of current and voltage and the respective slip ($s(t)$) are measured. The equivalent inductance ($l'o$) for the disappearing slip and a fading constant (a) are determined by the processor from the slip ($s(t)$) and the equivalent inductance ($l'(t)$) using the relationship:

$l'(t) = l'o \cdot e^{-a \cdot s(t)}$, where a is a decay constant. The processor determines the time curve of the associated load torque ($m_L(t)$), from the time curve of the slip ($s(t)$) over the rotor rpm ($n(t)$).

ADVANTAGE - No sensors and in general no auxiliary components are necessary, in order to determine electrical and mechanical variables.

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